

**CONFIDENTIAL**  
**(Patentability Search)**

**I. SEARCH FEATURE**

A. General

Storage system

B. Specific

A cache storage system connected to a client and at least one storage device through a network, comprising:  
a controller; and  
a device;  
wherein said controller controls said device to temporarily store block data which are exchanged between said client and said at least one storage device through said network and which designate a logical address on a storage medium and a data length.

**II. FIELD OF SEARCH**

The search of the above features was conducted in the following areas:

A. Classification search

<u>Class</u>	<u>Subclasses</u>	<u>Description</u>
707/		<b>DATA PROCESSING: DATABASE AND FILE MANAGEMENT OR DATA STRUCTURES</b>
	10	. Distributed or remote access
	203	.. Version management
	205	. File allocation
709/		<b>ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: MULTICOMPUTER DATA TRANSFERRING OR PLURAL PROCESSOR SYNCHRONIZATION</b>
	219	. Accessing a remote server

<u>Class</u>	<u>Subclasses</u>	<u>Description (Continued)</u>
711/		<b>ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: MEMORY</b>
	112	... Direct access storage device (DASD)
	114	.... Arrayed (e.g., RAIDs)
	118	.. Caching
	144	.... Cache status data bit
	153	.. Shared memory partitioning
	156	.. Status storage
	163	.. Access limiting
	202	. Address mapping (e.g., conversion, translation)

The above subclasses represent areas deemed to contain subject matter of interest to one or more of the search features. Please note that relevant references may be classified outside of these areas. The integrity of the search is based on the records as presented to us by the United States Patent and Trademark Office (USPTO). No further integrity studies were performed. Also a key word search was performed on the USPTO full-text database including published U.S. patent applications.

### III. RESULTS OF SEARCH

#### A. References developed as a result of search (related art is in boldface):

<u>U.S. Patent No.</u>	<u>Inventor</u>
5,948,062	<b>Tzelnic et al.</b>
<u>U.S. Patent Application Publication No.</u>	<u>Inventor</u>
2003/0140207 A1*	<b>Nagase et al.</b>
2003/0204677 A1	<b>Bergsten</b>
2004/0148479 A1	<b>Patel et al.</b>

\*Assigned to Hitachi, Ltd.

#### B. Discussion of related references in numerical order:

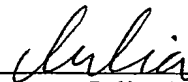
The patent to Tzelnic et al. (5,948,062) assigned to EMC Corporation provides for a *Network File Server Using a Cached Disk Array Storing a Network File Directory Including File Locking Information and Data Mover Computers each Having File System Software for Shared Read-Write File Access*. Discussed is a cached disk storage subsystem, which may store a file directory accessible by

data mover computers in response to file access requests to determine whether or not file access for a client is permitted. The data mover computer may perform file system tasks such managing directory for mapping of file names to logical blocks and locking and unlocking of files. To minimize loading on the cached disk array 23 during file access, each data mover may have a local cache of file directory information. Locking information in one local cache of a data mover may be replicated in another local cache (see column 2 lines 16-19, lines 22-27; column 10, lines 62-65; and column 11 lines 1-3).

The patent application publication to Nagase et al. (2003/0140207 A1) assigned to Hitachi, Ltd. provides for a *Hierarchical Storage Apparatus and Control Apparatus Thereof*. Discussed is a controller 201 which may include a communication interface 206 and a processor 207. The controller 201 may receive write and read requests from one or more hosts via an interface 206 and temporarily store a corresponding data block in a cache memory 203 (see figure 4, paragraph 33).

The patent application publication to Bergsten (2003/0204677 A1) provides for a *Storage Cache Descriptor*. Disclosed is a storage controller, which may store electronic data in a cache by including a cache descriptor that defines data, contained in a cache block, the cache descriptor including at least one field describing a device block of the cache block. Additionally, an electronic data storage apparatus may include a means for controlling data storage communicatively coupled to data storing means and means for caching data communicatively coupled to the controlling means (see paragraphs 7 and 8).

The patent application publication to Patel et al. (2004/0148479 A1) assigned to International Business Machines Corporation provides for a *Method, System, and Program for Transferring Data*. Discussed are hosts 2a...2n which may include a cache 20a...20n that may include cached data volumes from storage 4 as well metadata 24a...24n generated from storage manager 12. I/O managers 26a...26n may queue I/O requests in pending queue 16 if the host metadata 24a...24n indicate that a target location of data volumes 22a...22n from storage 4 is locked or being accessed as part of a data move operation (see figure 1, paragraph 20).



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